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EXAMINER	
MILLER, ROSE MARY	
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Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No. 10/804,047	Applicant(s) TREIBER ET AL.	
	Examiner Rose M. Miller	Art Unit 2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21,23-26,30 and 31* is/are rejected.

7)☒ Claim(s) *22 and 27-29* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/19/04*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because legal phraseology is not allowed in the Abstract. The phrases "comprising" and "comprises" are not allowed in the Abstract. Correction is required. See MPEP § 608.01(b).

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 13, 26, and 30 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by **Egami (US 5,955,669)**.

Egami discloses a configurable vibration sensor comprising a sensor circuit (see Figure 8), an analog-to-digital converter (11) coupled to the sensor circuit for converting output from the sensor circuit to a digital signal, a processor (microcomputer 12) coupled to the analog to-digital converter for processing the digital signals, wherein each sensor circuit comprises a vibration sensing element (3) and a variable bandwidth filter (16) coupled thereto, and wherein each variable bandwidth filter is controllable by the processor (16 controlled by processor through timing signal generator 15) such that the operation of each variable bandwidth filter is variable by the processor.

With regards to claim 13, **Egami** discloses a multiplexor (19) coupled between the sensor circuit (see Figure 8) and the processor (12) for providing the processor with output from the sensor circuit.

With regards to claim 26, **Egami** discloses an enclosure (4) for housing the sensor circuit, the analog-to-digital converter (11) and the processor (12).

With regards to claim 30, **Egami** discloses a sensor circuit for a configurable vibration sensor (see Figure 8), the sensor circuit for coupling to a processor (12) through an analog-to-digital converter (11), the sensor circuit comprising a vibration sensing element (3) and a variable bandwidth filter (16) controllable by the processor (16 controlled by processor through timing signal generator 15) such that the operation of the variable bandwidth filter is variable by the processor.

5. Claims 1-2, 7-8, 13-14, 26, and 30-31 are rejected under 35 U.S.C. 102(b) as being anticipated by **Demjanenko et al. (US 4,980,844)**.

Demjanenko et al. discloses a configurable vibration sensor comprising one or more sensor circuits (see Figure 1B), one or more analog-to-digital converters (39 in Figure 1A) coupled to the one or more sensor circuits for converting output from the one or more sensor circuits to one or more digital signals; and a processor (14) coupled to the one or more analog-to-digital converters (39) for processing the one or more digital signals; wherein each of the sensor circuits comprises a vibration sensing element (15-22) and a variable bandwidth filter (filter 52 programmable and selects appropriate bandwidth, see column 5 lines 65-67 and column 6 lines 49-65), and wherein each variable bandwidth filter of the sensor circuits is controllable by the processor (computer 14 controls the signal conditioner control 53 which in turn controls the bandwidth of the filter bank) such that the operation of each variable bandwidth filter (52) is variable by the processor.

With regards to claim 2, **Demjanenko et al.** discloses at column 6 lines 60-65 that the "appropriate bandpass frequency is selected independently for each signal by the signal conditioner control 53 and communicated to filter bank 52". Therefore, it is inherent in the system disclosed that the operation of the variable bandwidth filter of each sensor circuit is independently variable by the processor.

With regards to claim 7, **Demjanenko et al.** discloses each of the one or more sensor circuits comprising a variable gain amplifier (51) coupled to the respective

vibration sensing element thereof (see Figure 1B), and wherein each variable gain amplifier is controllable by the processor (computer 14 controls the amplifiers through signal conditioner control 53) such that operation of each variable gain amplifier is variable by the processor (14).

With regards to claim 8, **Demjanenko et al.** discloses at column 6 lines 28-36 that the variable amplification of the acceleration signals is "independently selectable for each signal". Therefore, it is inherent in the system disclosed by **Demjanenko et al.** that the operation of the variable gain amplifier of each sensor circuit be independently variable by the processor (14).

With regards to claim 13, **Demjanenko et al.** discloses a multiplexer (38) coupled between the sensor circuits and the processor (see Figure 1A) for providing the processor with output from at least one of the sensor circuits.

With regards to claim 14, **Demjanenko et al.** discloses the multiplexer (38) being controllable by the processor (computer 14 controls the multiplexer through control logic 41) such that in operation the multiplexer provides output from at least one of the sensor circuits as selected by the processor.

With regards to claim 26, **Demjanenko et al.** discloses at column 5 lines 62-65 and column 7 lines 56-65 utilizing circuit boards which fit into a standard IBM-PC expansion slot for both the signal conditioner circuitry 12 and the data acquisition system 13. Therefore, it is inherent in the system of **Demjanenko et al.** that the sensor circuits (part of the signal conditioner circuitry 12), the one-or more- analog to digital converters (part of the data acquisition system 13) and the processor (computer 14) are provided within a single enclosure.

With regards to claims 30-31, **Demjanenko et al.** discloses a sensor circuit for a configurable vibration sensor, the sensor circuit (12, 13) for coupling to a processor (14) through an analog-to-digital converter (39), the sensor circuit comprising a vibration sensing element (accelerometers 15-22), a variable bandwidth filter (52) coupled to the vibration sensing element, wherein the variable bandwidth filter (52) is controllable by the processor (14) such that the operation of the variable bandwidth filter is variable by the processor (filter controlled by processor 14 through signal conditioner control 53),

and a variable gain amplifier (51) coupled to the sensing element (15-22), wherein the variable gain amplifier (51) is controllable by the processor (14) such that the operation of the variable gain amplifier (51) is variable by the processor (amplifier 51 is controlled by the processor 14 through the signal conditioner control 53).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1-2, 7-8, 13-21, and 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Irie et al. (US 5,847,658)** in view of **Bukhtiyarov et al. (US 4,215,404)**.

With regards to claims 1 and 2, **Irie et al.** discloses a configurable sensor comprising one or more sensor circuits (10), one or more analog-to-digital converters (11) coupled to the one or more sensor circuits (10), and a processor (6) coupled to the one or more analog-to-digital converters (11) for processing the one or more digital signals, wherein each of the one or more sensor circuits (10) comprises a vibration sensing element (2) and a filter (4).

Irie et al. discloses the claimed invention with the exception of the filter comprising a variable bandwidth filter and wherein each variable bandwidth filter is controllable by the processor such that the operation of each variable bandwidth filter is variable by the processor.

Bukhtiyarov et al. teaches a configurable vibration sensor utilizing a variable bandwidth filter (25) which is controllable by a processor (22) such that operation of the variable bandwidth filter (25) is variable by the processor (22) in order to measure vibrations from different elements of the automobile being monitored.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the system of **Irie et al.** with the programmable filter of **Bukhtiyarov et al.** in order to allow the measurement of different bands of vibration frequencies as would occur in different machines as **Bukhtiyarov et al.** clearly teaches that the vibration in an engine, while similar, is not exactly the same as the vibration which would be measured in a transmission and therefore the monitoring system must be able to handle both easily which can be done by changing the bandwidth characteristics of the filter in the monitoring system. It further would have been obvious to one of ordinary skill in the art to independently vary the characteristics of each of the filters of the vibration circuits in order to more easily tailor the system to the machine being monitored.

With regards to claims 7 and 8, **Irie et al.** teaches utilizing a variable gain amplifier (3) in each of the vibration sensing circuits (10), the variable amplifiers (3) being independently variable by the processor (6).

With regards to claims 13 and 14, **Irie et al.** teaches utilizing a multiplexor (5) controllable by the processor (6) for switching between outputs of the individual filters in the filter bank (4) for providing the processor with outputs from each of the filters. **Bukhtiyarov et al.** teaches utilizing a multiplexor (switch 4) controllable by a processor (computer 22) for providing the processor (22) with signals with output from each of the multiple sensor circuits (see Figure 1a). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the system of **Irie et al.** with a multiplexor as disclosed if the system were to monitor different bands of

frequency by alternating the receipt of the different bands of signals as taught or can be modified to include a multiplexor as taught by **Bukhtiyarov et al.** in order to monitor more than one vibration sensor circuit.

With regards to claim 15, it is inherent in the system disclosed by **Irie et al.** to include a digital-to-analog converter coupled to the processor (6) for converting output generated by the processor (6) into analog form to facilitate communication of output generated by the processor (6) to an external device adapted to receive analog input as **Irie et al.** clearly discloses outputting results from the processor (6) to an external device which includes a data output unit (display 8b). It is widely known throughout the art of measuring and testing that displays can either be analog or digital. Therefore, one of ordinary skill in the art would select the proper components (including a digital-to-analog converter) necessary to output the processor signals to the selected display device.

With regards to claim 16, **Irie et al.** teaches storing output generated by the processor (6) in a memory (18) prior to communicating the processor signals to the external device. It would have been obvious to one of ordinary skill in the art to place the memory before the digital-to-analog converter as one of ordinary skill in the art would know that the majority of processor memories are digital memories. Therefore, one of ordinary skill in the art would arrange the components of the system in the correct order to produce the desired output.

With regards to claim 17, it is inherent in the system disclosed by **Irie et al.** that the output generated by the processor (6) for storing in memory comprises at least one or more digital signals as the memories disclosed by **Irie et al.** (EEPROM or S-RAM) are digital memory storage devices.

With regards to claim 18, it is inherent in the system disclosed by **Irie et al.** to include a digital communications interface coupled to the processor (6) for facilitating communication of at least data between the processor (6) and an external device as **Irie et al.** clearly discloses outputting results from the processor (6) to an external device which includes a determination output unit (display 8b). It is widely known throughout the art of measuring and testing that output units can either be analog or digital.

Therefore, one of ordinary skill in the art would select the proper components (including a digital communications interface) necessary to output the processor signals to the selected device.

With regards to claim 19, **Irie et al.** teaches storing output generated by the processor (6) in a memory (18) prior to communicating the processor signals to the external device (output unit 8).

With regards to claim 20, it is inherent in the system disclosed by **Irie et al.** that the output generated by the processor (6) for storing in memory comprises at least one or more digital signals as the memories disclosed by **Irie et al.** (EEPROM or S-RAM) are digital memory storage devices.

With regards to claim 21, it would have been obvious to one of ordinary skill in the art to utilize a computer for the external device as it is well known throughout the art of measuring and testing to utilize a computer for further processing or storing signals generated by a testing system and **Irie et al.** clearly teaches utilizing external memories for storing the data generated by the testing system.

With regards to claim 30, **Irie et al.** discloses a configurable sensor comprising one or more sensor circuits (10), one or more analog-to-digital converters (11) coupled to the one or more sensor circuits (10), and a processor (6) coupled to the one or more analog-to-digital converters (11) for processing the one or more digital signals, wherein each of the one or more sensor circuits (10) comprises a vibration sensing element (2) and a filter (4).

Irie et al. discloses the claimed invention with the exception of the filter comprising a variable bandwidth filter and wherein each variable bandwidth filter is controllable by the processor such that the operation of each variable bandwidth filter is variable by the processor.

Bukhtiyarov et al. teaches a configurable vibration sensor utilizing a variable bandwidth filter (25) which is controllable by a processor (22) such that operation of the variable bandwidth filter (25) is variable by the processor (22) in order to measure vibrations from different elements of the automobile being monitored.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the system of **Irie et al.** with the programmable filter of **Bukhtiyarov et al.** in order to allow the measurement of different bands of vibration frequencies as would occur in different machines as **Bukhtiyarov et al.** clearly teaches that the vibration in an engine, while similar, is not exactly the same as the vibration which would be measured in a transmission and therefore the monitoring system must be able to handle both easily which can be done by changing the bandwidth characteristics of the filter in the monitoring system. It further would have been obvious to one of ordinary skill in the art to independently vary the characteristics of each of the filters of the vibration circuits in order to more easily tailor the system to the machine being monitored.

With regards to claim 31, **Irie et al.** teaches utilizing a variable gain amplifier (3) in each of the vibration sensing circuits (10), the variable amplifiers (3) being independently variable by the processor (6).

9. Claims 3-6, 9-12, and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Irie et al.** in view of **Bukhtiyarov et al.** as applied to claims 1, 7, and 18 above, and further in view of **Tsuji et al. (US 5,758,311)**.

With regards to claim 3, **Irie et al.** in view of **Bukhtiyarov et al.** fails to disclose a memory coupled to the processor for storing bandwidth settings or instructions associated with one or more bandwidth configurations, wherein each variable bandwidth filter of the one or more sensor circuits is associated with one or more bandwidth settings (or instructions) and wherein in operation the processor varies the operation of each variable bandwidth filter based on the value of the bandwidth associated therewith.

Tsuji et al. teaches storing a plurality of filter coefficient values (and therefore bandwidth values) in a memory (15, 21, 22) wherein during operation of the vibration sensor (1) the configuration of the filter is varied according to the settings stored within the memory.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of **Irie et al.** in view of **Bukhtiyarov**

et al. as taught by **Tsuji et al.** such that filter values or instructions containing the filter values, including bandwidth settings, are stored in a memory coupled to the processor such that the processor can vary the setting on the one or more filters to match the desired vibration characteristics which are to be measured in accordance with the stored filter values or instructions.

With regards to claim 5, **Irie et al.** teaches utilizing an external device (input means 7) to enter the values of the filters (4) of the system (see column 7 lines 1-8).

With regards to claim 6, it would have been obvious to one of ordinary skill in the art to utilize a computer for the external device (input means 7) and to utilize a digital communication interface for coupling to the computer as it is well known throughout the art of measuring and testing to replace a manual operation such as the input of a setting with an automatic means for performing such manual operation (see In re Venner, 120 USPQ 192 (CCPA 1958)) and the most utilized means of performing that automatic operation is a computer. As for the use of a digital communication interface, one of ordinary skill in the art would know to utilize the necessary components, including a digital communication interface, to provide the connection between the desired components and the testing system disclosed.

With regards to claims 9-10, **Irie et al.** in view of **Bukhtiyarov et al.** fails to disclose a memory coupled to the processor for storing amplifier settings or instructions associated with one or more amplifier configurations, wherein each variable gain amplifier of the one or more sensor circuits is associated with one or more amplifier settings (or instructions) and wherein in operation the processor varies the operation of each variable gain amplifier based on the value of the gain associated therewith.

Tsuji et al. teaches storing a plurality of filter coefficient values (and therefore bandwidth values) in a memory (15, 21, 22) wherein during operation of the vibration sensor (1) the configuration of the filter is varied according to the settings stored within the memory.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of **Irie et al.** in view of **Bukhtiyarov et al.** as **Tsuji et al.** such that amplifier gain values or instructions containing the gain

values, including variable gain settings, are stored in a memory coupled to the processor such that the processor can vary the setting on the one or more amplifiers to match the desired vibration characteristics which are to be measured in accordance with the stored amplifier values or instructions as **Tsuji et al.** teaches that storing setting for components which can be varied allows for more flexibility and a faster response time of the testing system.

With regards to claim 11, **Irie et al.** teaches utilizing an external device (input means 7) to enter the values of the filters (4) of the system (see column 7 lines 1-8). Therefore, it would have been obvious to one of ordinary skill in the art to provide the system with a similar device to enter the values of the variable gain amplifier if such setting were desired.

With regards to claim 12, it would have been obvious to one of ordinary skill in the art to utilize a computer for the external device (input means 7) and to utilize a digital communication interface for coupling to the computer as it is well known throughout the art of measuring and testing to replace a manual operation such as the input of a setting with an automatic means for performing such manual operation (see In re Venner, 120 USPQ 192 (CCPA 1958)) and the most utilized means of performing that automatic operation is a computer. As for the use of a digital communication interface, one of ordinary skill in the art would know to utilize the necessary components, including a digital communication interface, to provide the connection between the desired components and the testing system disclosed.

With regards to claim 23, **Irie et al.** in view of **Bukhtiyarov et al.** fails to disclose a memory coupled to the processor for storing one or more digital filter programs and associated filter configuration parameters wherein in operation the processor executes selected digital filter programs such that one or more digital filters are applied to at least a subset of the one or more digital signals based on the configuration parameters associated with the applied digital filters.

Tsuji et al. teaches storing a plurality of filter programs (mappings) in a memory (15, 21, 22) wherein during operation of the vibration sensor (1) the configuration of the digital filter is varied according to the settings stored within the program.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of **Irie et al.** in view of **Bukhtiyarov et al.** as taught by **Tsuji et al.** such that filter programs containing the filter values, including bandwidth settings, are stored in a memory coupled to the processor such that the processor can vary the setting on the one or more digital filters to match the desired vibration characteristics which are to be measured in accordance with the stored filter values or instructions as **Tsuji et al.** teaches the advantages of utilizing digital filters and filter programs which enable greater flexibility in the testing system.

With regards to claim 24, **Irie et al.** teaches utilizing an external device (input means 7) to enter the values of the filters (4) of the system (see column 7 lines 1-8).

With regards to claim 25, it would have been obvious to one of ordinary skill in the art to utilize a computer for the external device (input means 7) and to utilize a digital communication interface for coupling to the computer as it is well known throughout the art of measuring and testing to replace a manual operation such as the input of a setting with an automatic means for performing such manual operation (see In re Venner, 120 USPQ 192 (CCPA 1958)) and the most utilized means of performing that automatic operation is a computer. As for the use of a digital communication interface, one of ordinary skill in the art would know to utilize the necessary components, including a digital communication interface, to provide the connection between the desired components and the testing system disclosed.

Allowable Subject Matter

10. Claims 22 and 27-29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Shimauchi et al. (US 4,044,239) discloses a method and apparatus for adjusting vibration frequency of a vibrating object.

Lyons (US 4,063,450) discloses a voltage controlled electronic filter.

Kataoka et al. (US 5,041989) discloses a method and apparatus for observing operating state of a mechanical seal.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rose M. Miller whose telephone number is 571-272-2199. The examiner can normally be reached on Monday - Friday, 7:30 am to 3:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on 571-272-2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RMM
19 August 2005

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